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| APPLICATION NO.                                                                                                                  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.               | CONFIRMATION NO.       |
|----------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------|-----------------------------------|------------------------|
| 10/562,498                                                                                                                       | 12/27/2005  | Kazuhiko Katsumata   | ASAIN0173                         | 6594                   |
| 113 7590 03/18/2008<br>GRIFFIN BUTLER WHISENHUNT & SZIPL LLP<br>SUITE PH-1<br>2300 NINTH STREET SOUTH<br>ARLINGTON, VA 222042396 |             |                      | EXAMINER<br>JUETTNER, ANDREW MARK |                        |
|                                                                                                                                  |             |                      | ART UNIT<br>3749                  | PAPER NUMBER           |
|                                                                                                                                  |             |                      | MAIL DATE<br>03/18/2008           | DELIVERY MODE<br>PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/562,498

**Applicant(s)**

KATSUMATA, KAZUHIKO

**Examiner**

ANDREW M. JUETTNER

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-8 is/are rejected.
- 7) ☒ Claim(s) 4 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 December 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/S5108)  
Paper No(s)/Mail Date 12/27/2005
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: reference 26c referring to the upper suction port and reference 21 referring to the vacuum vessel and also to the gas circulating device is not on figures, 21a-21e are though . Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

2. The disclosure is objected to because of the following informalities:
- I. Mistakenly uses 44a instead of 44b to refer to the discharge opening on page 27, line 24.
  - II. Refers to bearing 43a on page 26 while the bearing is labeled 42a on figure 8.
  - III. Reference number 44 is mistakenly used to refer to both the stationary and rotary plates on page 25, 42 should be used for the stationary plate.

IV. Mistakenly switches reference numbers used to describe the lower suction port, 26b, and the upper suction port, 26c, on page 20.

V. Reference number 21 is used to describe multiple elements, both the vacuum vessel and the gas circulation device, pages 20 and 21.

Appropriate correction is required.

### ***Claim Objections***

3. Claim 8 is objected to because of the following informalities: Claim 8 recited on line 4 that "the a cooling fan". The "the" should be removed.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 5-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 is indefinite because there is no clear transition between the preamble and the body of the claim. It is difficult to determine where positive recitation of limitations begins. For the purposes of applying art claim 5 is interpreted as positively reciting a cooling chamber surrounding a cooling zone and a gas cooling and circulation device.

Claim 5 is indefinite because it is unclear how a plate can have an opening which passed through the plate over the entire surface. There would no plate with there was

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an opening over the entire surface. For the purposes of applying art claim 5 is being interpreted as a plate with at least one opening passing therethrough which allows gas to circulate to suction and discharge ports of the gas circulating device. Claims 6-8 are rejected as being indefinite because they depend from claim 5.

Claim 5 is also indefinite because it is unclear under what circumstances the direction of the gas passing is "alternately switched" based on the claim as recited.

Claims 6 and 7 are indefinite because it is unclear whether the cooling chamber has "an opening" or if "an opening" is provided elsewhere. For the purposes of applying art the claims are interpreted as "an opening" being provided in the cooling chamber.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,821,114 to Kisoda (Kisoda).

In Reference to Claim 1

Kisoda teaches:

A gas cooling type vacuum heat-treating furnace incorporating a gas cooling furnace (101, see fig. 6) for cooling an article which has been heated, with pressurized circulation gas, characterized in that the gas cooling furnace comprises a cooling gas surrounding a cooling zone (104) where the article to be

heat- treated is stationarily set, and defining therein a vertical gas passage (indicated by arrows passing through openings 106a and 106b, see fig. 6) having a constant cross-sectional area, a gas cooling and circulating device (cooler 109 and fan 108) for cooling and circulating gas vertically flowing in the cooling chamber, a gas direction switching device (dampers 110a and 110b) for switching directions of gas vertically flowing in the cooling chamber.

Kisoda does not disclose upper and lower straighteners blocking upper and lower ends of the cooling chamber, for the embodiment taught in figure 6, for causing a flowing velocity distribution of the gas passing therethrough to be uniform.

Kisoda does teach in another embodiment (see figs. 1 and 2) upper and lower straighteners (vents 9A and 9B) blocking upper and lower ends of the cooling chamber (see figs. 1 and 2), for causing a flowing velocity distribution of the gas passing therethrough to be uniform (column 5, lines 45-50). Kisoda teaches that the vents are provided to avoid cooling gas being concentrated in the center portion (column 1, lines 42-47 and lines 64-67).

It would have been obvious to one having ordinary skill in the art at the time of the invention to add the vents as taught for the embodiment of figures 1 and 2 to the openings 106a and 106b of the embodiment of figure 6 in order to avoid concentration of the cooling gas in the center.

#### In Reference to Claim 2

Kisoda teaches:

- A gas cooling type vacuum heat-treating furnace as set forth in claim 1 (see rejection of claim 1 above), characterized in that each of the upper and lower straighteners (9A and 9B) comprise a uniform distribution portion and a straightening portion which are stacked one upon another, or have both functions of a uniform distribution portion and a straightening portion (9A and 9B have both functions of uniform distribution, column 5, lines 45-50, and straightening because 9A and 9B are made up of member 19 which tend to direct the flow of gas in a straight direction as they flow through and out of the vents 9A and 9B), the uniform distribution portion has a plurality of pressure loss inducing means uniformly arranged in a direction orthogonal to an upward gas stream (the vents are arranged with a plurality of members 19, see figs. 1, 2, and 5; also the members can be adjusted in size because of their construction, column 5, lines 64-67), for applying a flow resistance corresponding to a pressure loss coefficient of not less than 0.1, to the upward gas stream so as to aim at uniformly distributing flow velocities, and the straightening portion has a plurality of straightening grids (the vents are arranged with a plurality of members 19, see figs. 1, 2, and 5) for straightening flowing directions of the upward gas stream having passed through the uniform distribution portion.
8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kisoda as applied to claim 1 above, and further in view of US 4,963,091 to Hoetzel et al. (Hoetzel).
- Kisoda teaches a gas cooling type vacuum heat-treating furnace as set forth in claim 1 (see rejection of claim 1 above), but does not disclose auxiliary distribution

mechanisms for guiding directions of gas streams flowing into the cooling chamber upward and downward from the gas direction switching device.

Hoetzel teaches a vacuum furnace (see fig. 1) with dampers (D) located in the cooling gas circulation path which are manipulated to direct the flow the cooling gas for uniform heat transfer (Column 2, lines 25-40).

It would have been obvious to one having ordinary skill in the art at the time of the invention to add flow directing dampers as taught by Hoetzel to the vacuum furnace of Kisoda in order to enhance the flow of gases through the furnace to improve heat transfer uniformity.

***Allowable Subject Matter***

9. Claims 4-8 are allowed.
10. Claim 4 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
11. Claims 5-8 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.
12. The following is a statement of reasons for the indication of allowable subject matter: The prior teaches a vacuum furnace with a cooling zone, a gas cooling and distribution device, and a gas direction switching device that is capable of reversing the flow of the gas through the cooling chamber. However, the prior does not disclose where the gas switching device is a hollow cowling that surrounds the heat exchanger as is recited in claim 4. The prior art also fails to disclose a gas direction switching

device that has a stationary plate between the cooling chamber and the gas cooling and circulating device and a rotary partition that rotates along the outer surface of the stationary plate. US 4,836,776 to Jomain teaches a vacuum furnace with a cooling chamber, heat exchangers, and fan (see fig. 1). Jomain teaches a gas direction switching device that is comprised of a rotating volute (9) with a suction port (941) in the center and an outlet (93) along the periphery (see figs. 2 and 3). The volute is rotated about an axis which results in the air being directed in different directions (see figs. 4-7). Jomain fails to disclose the stationary partition plate. Therefore claim 5 is allowable. Claims 6-8 are allowable because they depend from claim 5.

### ***Conclusion***

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Katsumata '567 and Katsumata '786 are related applications to the present application. Hoetzi '610 discloses a vacuum furnace but without reverse gas flow. Moller discloses a vacuum furnace with flow straighteners. Pfau discloses a vacuum furnace with flow straighteners. Sugiyama discloses a vacuum furnace with alternating gas flow directions and gas flow straighteners. Schmetz discloses a vacuum furnace with gas flow straighteners.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANDREW M. JUETTNER whose telephone number is (571)270-5053. The examiner can normally be reached on Monday through Friday 7:30am to 5pm Est..

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steve McAllister can be reached on (571) 272-6785. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AMJ

/A. M. J./  
Examiner, Art Unit 3749

/Steven B. McAllister/  
Supervisory Patent Examiner, Art Unit 3749